

PANEL AND SUPPORT STRUCTURE FOR COLLAPSIBLE CONTAINER ,AND COLLAPSIBLE CONTAINER

5 FIELD OF THE INVENTION

This invention relates to a collapsible container and more particularly, but not exclusively, to a collapsible container for use in packaging and transportation.

10 BACKGROUND TO THE INVENTION

In order to cut shipping costs, re-usable containers are used to ship articles. Empty containers are shipped back to the owner or supplier for reuse thereof. The empty containers take up large volumes of empty space that makes
15 shipping thereof expensive.

Collapsible, reusable containers provide a less expensive alternative to non-collapsible, reusable or non re-useable containers. Collapsible containers are not, however, always rigid and strong enough for frequent reuse.

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United States Patent number 4,266,670 entitled "Collapsible Reinforced Container" discloses a four sided container attached to a rigid base for transporting heavy products. The containers may be collapsible and shipped in reduced size for reuse and reassembled into its usable form without any
25 special tools or skills. The collapsible container of this invention provides that one or more sides may be opened for loading or unloading. Sides of the

container panels have fastening means in a form of complimentary mortises and tubular tenons. The tenons are rectangular in cross section and receive solid corner posts there through. The corner posts are also square in cross section.

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United Kingdom Patent application number GB 2 206 280 A entitled "Furniture Modules" discloses furniture modules of two or more panels joined through interleaving edges which edges may be tubing arranged on one edge to interleave with similar tubing on the edge of an adjacent panel. Rods extend
10 through the hollow tubes to secure the panels together.

OBJECT OF THE INVENTION

An object of the present invention is to provide a collapsible container of the
15 type described above.

SUMMARY OF THE INVENTION

According to the invention there is provided a panel for a collapsible container
20 including:

a body; and

an elongate tubular member secured to an edge of the body;

the tubular member having at least one cut-away section to form an interlocking formation.

There is provided for the cut-away section in the tubular member to be a section where a segment of the tubular member has been removed, and for the cut-away section to define a mortise adjacent a tenon formed by the tubular member where it is not cut-away.

There is further provided for the panel to include a securing cover for securing the tubular member to the body of the panel, the securing cover comprising a sheet of pliable material that is wrapped around the tubular member, with opposite ends of the sheet being secured to opposite sides of the body of the panel.

A further feature of the invention provides for the body of the panel to be made from reinforced material that comprises two outer laminations and an inner reinforcing structure. The inner reinforcing structure may comprise a honeycomb structure.

A still further feature provides for the outer laminations to at least partially overlie the tubular section when secured to the edge of the panel.

Further features of the invention provide for tubular members to be provided on all edges of the body; for tubular members preferably to be provided on ends of

the edges of the panel and alternatively for tubular members to be provided on sides of the edges of the panel.

According to a further aspect of the invention there is provided a collapsible
5 container comprising a number of panels each having a panel body having
interlocking means on an edge of the panel body, the interlocking means being
arranged to releasably interlock with complementary interlocking means on an
edge of an adjacent panel, for the interlocking means to define mortises and
tenons and for the mortises to be shaped so that a tenon is received therein so
10 that it cannot perfectly align axially with an adjacent tenon.

According to a further feature of the invention there is provided for the panels to
be rectangular or square and to have interlocking means on all four edges.

15 Further according to the invention there is provided for the tenons to be hollow
tubular sections and for engagement members to be receivable through
adjacent tenons.

Still further according to the invention, the tenons and mortises on each edge
20 are formed from one tubular member; and for the mortises to be formed by
removing sections of the tubular member.

According to a still further feature of the invention the major axis of each tubular member is substantially parallel to the edge of the panel.

Still further according to the invention, the engagement members are solid rods
5 or alternatively tubular cylinders.

At least one panel may have operatively downwardly protruding support structures to allow for the panel to be raised from a flat surface on which it is supported so that the tongs of a forklift are locatable underneath the panel.

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There is provided for a support structure for of the collapsible container to include:

- a plurality of reinforced panels;
- the panels being stacked on top of one another, and being secured in a
15 stacked position.

The support structure may further include at least one L-shaped channel section for supporting the stacked reinforced panels, and preferably includes two mirrored L-shaped channel sections for supporting the stacked reinforced
20 panels.

The reinforced panel of the support structure may comprises two outer laminations and a reinforced inner structure, the outer laminations being made

of cardboard or craft paper, and the reinforced inner structure honeycomb structured cardboard or craft paper

These and other features of the invention are described in more detail below.

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BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention is described below, by way of example only, and with reference to the accompanying drawings in which:

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Figure 1 shows a perspective view of a collapsible container;

Figure 2 shows an exploded perspective view of the collapsible container of figure 1;

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Figure 3 shows a plan view of the collapsible container of figures 1 and 2;

Figure 4 shows an underside view of the collapsible container of figures 1 to 3;

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Figure 5 shows a side elevation of the collapsible container of figures 1 to 4;

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Figure 6 shows a front innovation of the collapsible container of figures 1 to 5;

Figure 7 shows a partial cross-sectional perspective view of an edge of a panel of the container of figures 1 to 6; and

Figure 8 shows a partial perspective view of two interlocked panels of the container of figures 1 to 7.

Figure 9 shows a perspective cross-sectional view of a support structure of the container of figure 1 to 8.

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to the drawings, in which like numerals indicate like features, a collapsible container is generally indicated by reference numeral 1.

The container 1 is cubed shaped and consists of a number of square panels 2. More specifically, the container consists of a bottom panel 2a, four side panels 2b and a top panel 2c.

Each panel 2 comprises a body having elongate tubular members 26 secured to edges of the body. The tubular members include cut-away sections 7 that

form interlocking formations. The interlocking formations are in the form of tubular tenons 6 and complimentary mortises 7, and are typically provided on all four edges of each panel body. It will be appreciated that an edge of each panel may include only one tenon to interlock inbetween two complimentary
5 tenons on an adjacent panel as described below. The mortises are formed by cutting away sections in the tubular members located on edges of the panels.

The panel body is laminated and includes outer laminations 66 as is shown in Figure 7 and an inner lamination 65 in the form of a honey comb type
10 cardboard member interposed between the outer laminations 66. The panel as well as honeycomb structure may also be made from plastic, wood, steel or any other suitable material.

Each tenon 6 is made of a tube section 26 secured to the edge of the panel
15 body 12 with an axis of each tube substantially parallel with the edge of the panel body 12. In this embodiment, the tube is secured with a paper sheet section 67 extending around the tube with opposed ends of the section 67 secured on opposite sides of the panel body. To form the cube shaped container 1, complementary mortises and tenons are engaged and
20 engagement rods 5 are located through the tubular interengaged tenons to interlock the panels.

The mortises and tenons are formed by locating a tube 26 on an edge of each panel. The tube is then pressed into the panel and forced part-way inbetween the outer laminations and into the honeycomb member. The sheet section 67 is then glued around the tube and onto opposite sides of the panel to secure
5 the tube in place.

Mortises are now formed by cutting the tube section at regular intervals and removing tube sections between alternate cuts so that an inner half of the tube section remains in the thus formed mortise 7. The use of one tube having only
10 sections removed provides added strength.

The mortises are formed so that a tenon 6 of an adjacent panel received therein does not align i.e is not concentric with, adjacent tenons. This provides for a more secure or friction fit of the rods 5 through the tenons. Although figure
15 2 shows only some of the rods, it will be appreciated that twelve rods will be required to assemble a container as depicted in figure 2.

The bottom panel has downwardly protruding supports 4 in the form of three elongate cardboard blocks so that the bottom panel is raised from a flat surface
20 of which it is supported by the supports. This will allow for the tongs of a forklift to be easily insertable underneath the bottom panel and thus the container.

The supports 4 are shown in more detail in figure 9 and include a plurality of reinforced panels 81 that are stacked and secured on top of one another. The stacked reinforced panels are supported by two elongate L-shaped channels 82 that are secured to the stacked reinforced panels by glue or any other
5 suitable securing means. The supports are subsequently secured to the bottom of the collapsible container.

Strapping can be located through the tenons to further secure the panels together and/or to provide tamper indication.

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It is envisaged that the reusable packaging will be more cost effective if the empty containers are collapsible so as not to take up unnecessary space during return shipment.

15 The container is made of cardboard paper and is biodegradable and may also be recycled. Some municipalities or companies may even offer payment for used containers and/or panels.

It will be appreciated that the invention is not limited to the precise details as
20 described herein. For example, interlocking formations on adjoining panels may be released and resecured by means of a fix and fit and the engagement member need not be a rod but may be hooks or lockable pins. The panels furthermore do not have to be of rectangular shape, and may be of any

polygonal shape. The panels also do not need to be entirely planar, and can be of arcuate configuration. It will furthermore be appreciated that the assembled container may be in the form of a tetrahedron, pyramid, cube or any other suitable three-dimensional configuration. It will also be appreciated that

5 the tubular members may be located on ends of the edges of the panels, or on sides of the edges of the panels.